Research Paper

Volume : 5 | Issue : 3 | March 2016 • ISSN No 2277 - 8179 | IF : 3.508 | IC Value : 69.48

# Fresh Leaf Consumption and Ratio of Leaf – Cocoon of Tropical Tasar Silk Worm Antheraea Mylitta Drury (Saturniidae) During Rainy Season

Zoology

**KEYWORDS :** Consumption, ratio, leaf, cocoon, instar, Antheraea mylitta.

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## ABSTRACT

*Antheraea mylitta Drury is a polyphagous silk worm which feeds on a number of different host plants. But Terminalia alata is considered to be its most preferred host plant. The amount of fresh leaf consumption is determined instar wise and during the entire larval period. The amount of leaf consumption gradually increased with progress of instars and suddenly was much higher during 5th instar. Ultimately the ratio of consumed leaf in each instar and for one cocoon was determined. It was 145. 02 g for production of one cocoon.*

## INTRODUCTION

Nutritional factors of the silk worm is very important with regard to production of cocoons and raw silk. For this the proper selection of host plant is of paramount importance [7,6] especially for the tasar silk worm. *Antheraea mylitta* Drury feeds on a number of host plants although *Terminalia alata* is of primary importance. Several literatures are available on nutrition of *Bombyx mori* Linn. [14,8,9] , *Philosamia ricini* Hutt [11,12,17] and other Lepidopterous larvae[5]. Some information are available on consumption of *Paropsis atomaria*[1] and *Pseudoplusia includens* [13], *Poekilocerus pictus* [4] and *Camnula pellucida*[15]. Earlier the energetics of *A. mylitta* was studied[2] and effect of food plants and altitude on growth of larva of *A. mylitta* was reported[10]. But no literature is traced regarding instar wise leaf consumption and leaf – cocoon ratio of *A. mylitta* feeding on *Terminalia alata*. So the present study is carried out.

## MATERIALS AND METHODS

Twenty healthy hatchlings of same age were chosen at random out of a buffer stock and were reared on different branches of *Terminalia alata* host plant. The branches chosen for leaf consumption of a larva were marked by different serial numbers. At the base of each branch a cone shaped plastic was fixed in order to prevent the movement of larva to other branches. Prior to this all the leaves present in the selected branches were allotted different serial numbers and the area of each leaf was traced on different sheets of graph papers marking the serial number below each graph. The larva released in each branch was kept under constant observation to detect the leaves consumed by the larva. Habitually the larva partially feeds on a leaf and moves to another leaf for feeding. To determine the amount of leaf consumed during each instar, the partially eaten leaves were plucked from the experimental branches. A similar sized leaf was chosen from branch of another identical plant matching the traced area. The weight of the total leaf and partially consumed leaf was determined gravimetrically to know the amount of actual leaf consumed .The ratio of consumed leaf at each instar was determined. The percentage of leaf consumption during each instar of the total consumption during larval life was calculated. For estimating instar wise rearing capacity of *T. alata* food plants of different ages, the obtained data was correlated with the information earlier reported[16].

## RESULT AND DISCUSSION

The amount of fresh leaf of *T. alata* consumed by the first, second, third and fourth instar larva was 0.29g±0.04, 1.34g±0.19, 4.13g±0.93 and 16.89g±2.83 respectively ( Table 1 ). But the fifth instar larva consumed 122.37g±5.46 of fresh leaf. This shows sudden rise of food consumption in fifth instar stage. Thus the leaf(g) – instar ratio in first, second, third and fourth instar stage was 0.29:1, 1.34:1, 4.13:1 and 16.89:1 respectively, while in fifth instar stage it was too high i.e. 122.37:1. The percentage of leaf consumed during first, second, third and fourth instar was 0.20%, 0.92%, 2.85% and 11.65% of the total leaf consumed during the entire larval period. But only during fifth instar the percentage of leaf consumed was 84.38 of the total consumed leaf during larval life span ( Table 1 ). It is observed that almost 6 times of the amount of leaf consumed during first to fourth instar was only consumed by fifth instar. So fifth instar appears to be most crucial stage for utmost care during rearing operation. From the amount of consumed leaf by the different instar larvae of *A. mylitta,* it is calculated that in a three year aged *T. alata* plant 1532, 331, 107 and 26 number of first, second, third and fourth instar larvae can be reared respectively. But only 3 number of fifth instar larvae can spend their entire larval life in a 3 year aged plant without facing starvation stress ( Table 1 ). Similarly in a 4 year aged host plant, 4128, 893, 289, and 70 number of first, second, third and fourth instar larvae of *A. mylitta* can be reared while only 9 number of fifth instar larvae can be safely reared without facing any starvation stress ( Table 1 ). In a 5 year aged *T. alata* host plant 7840, 1696, 550 and 134 number of first, second, third and fourth instar larvae of *A. mylitta* can be reared. But in the similar plant only 18 number of fifth instar larvae can be reared until cocoon stage. Table 1 indicates that for the complete larval period 145.02g of leaf is required. Since one healthy larva can produce one cocoon at the end of fifth instar after ceasing feeding, so it is determined that the ratio of one cocoon-leaf (g) is 1 : 145. Further it is observed that basing on the cocoon-leaf ratio, in a 3 year aged plant 3 cocoons can be procured. Similarly in a 4 year aged plant 9 and in a 5 year aged plant 18 number of cocoons can be conveniently harvested. This data also confirms that the frequent manual transfer of larvae to other plants from instar to instar after all leaves are exhausted, can be avoided to exclude the chance of physical stress on larvae during manual transfer and the related chance of diminished silk yield can be also minimized.

The above findings on *A. mylitta* bear direct practical application in the field level where the larvae are reared under semi domesticated condition in open rearing fields. The physical transfer of larvae becomes stressful for the insects[3] . It also inhibits the amount of yield of silk during formation of cocoons .The watch and ward necessary during rear-

ing activities can be better handled by fixing the number of larvae to be reared for the entire larval period in a particular plant. Further studies are suggested to confirm the real enhancement of silk productivity and other commercial aspects by applying these findings.

**Table 1 : Consumption of amount ( ± SD ) of fresh leaf of *T. alata* by different instars of *A. mylitta*.**

| Instar | N | Amount of fresh leaf consumed (g) | Consumed Leaf – instar ratio | Instar wise % of total consumed leaf of the entire larval period | Number of silk worms to be brushed in a 3 year aged plant | Number of silk worms to be brushed in a 4 year aged plant | Number of silk worms to be brushed in a 5 year aged plant |
|---|---|---|---|---|---|---|---|
| First | 20 | 0.29 ± 0.04 | 0.29 :1 | 0.20 | 1532 | 4128 | 7840 |
| Second | 20 | 1.34 ± 0.19 | 1.34 : 1 | 0.92 | 331 | 893 | 1696 |
| Third | 20 | 4.13 ± 0.93 | 4.13 : 1 | 2.85 | 107 | 289 | 550 |
| Fourth | 20 | 16.89 ± 2.83 | 16.89 : 1 | 11.65 | 26 | 70 | 134 |
| Fifth | 20 | 122.37 ± 5.46 | 122.37 : 1 | 84.38 | 3 | 9 | 18 |

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